

Electrical Distribution and Installation in Industrial Plants

Course general description:

Electrical systems are the backbone of process and industrial plants, ensuring reliable power supply, efficient operations, and safety. This course provides a comprehensive understanding of electrical technology applications, system design principles, configurations, and maintenance practices tailored for industrial environments. Participants will learn how to design, inspect, maintain, repair, and troubleshoot electrical systems to ensure optimal performance, minimize downtime, and comply with industry standards. Through lectures, hands-on tutorials, case studies, and practical exercises, this course equips participants with the skills to manage electrical systems effectively in industrial settings.

Audience:

This course is designed for:

- Electrical engineers and technicians working in process and industrial plants.
- Maintenance personnel responsible for electrical systems in manufacturing facilities.
- Plant engineers and operators involved in power distribution and control systems.
- Energy consultants and project managers overseeing industrial electrical projects.
- Graduates and postgraduates in electrical engineering seeking practical expertise.

Course objectives:

By the end of this course, participants will be able to:

- Understand the principles and applications of electrical technology in process and industrial plants.
- Design and configure electrical systems for specific industrial applications.
- Conduct routine inspections, preventive maintenance, and repairs on electrical equipment.
- Troubleshoot common issues in electrical systems and implement corrective actions.
- Apply industry best practices for safe and reliable operation of electrical systems.
- Use diagnostic tools and techniques to assess system health and performance.

Course duration:

5 days

Course location:

Dubai

Course contents:

Day-1: Fundamentals of Electrical Distribution Systems

1. Introduction to electrical distribution systems and key components.
2. Overview of distribution system types: Radial, ring main, and mesh systems.
3. Industrial electrical loads: Lighting, HVAC, machinery, and process equipment.
4. Voltage levels and load balancing in distribution systems.
5. Hands-on panel demonstration, case study on overload outages, quiz, and pretest.

Day-2: Design and Planning of Electrical Distribution Systems

1. Principles of designing industrial electrical distribution systems.

2. Single-line diagrams, feeder circuits, and substation layouts.
3. Cable selection and sizing based on current capacity and environmental factors.
4. Importance and implementation of earthing and bonding systems.
5. Group exercise on designing a single-line diagram, case study on cable sizing, and quiz.

Day-3: Installation Practices and Safety

1. Best practices for electrical installations: Wiring, conduit systems, and cable trays.
2. Installation of transformers, switchgears, and motor control centers (MCCs).
3. Electrical safety during installation: LOTO, arc flash prevention, and PPE.
4. Compliance with NEC, IEC, and IEEE standards for safe installations.
5. Hands-on wiring exercise, case study on installation failures, and quiz.

Day-4: Inspection, Maintenance, and Repair

1. Routine inspection procedures: Visual checks, thermal imaging, and insulation testing.
2. Preventive maintenance schedules for electrical components.
3. Identifying wear-and-tear issues like overheating and insulation degradation.
4. Repair techniques: Component replacement, motor rewinding, and transformer reconditioning.
5. Practical transformer inspection, maintenance planning case study, and quiz.

Day-5: Troubleshooting and Final Assessment

1. Common faults in electrical distribution: Overloads, short circuits, ground faults.
2. Root cause analysis using data logging, diagnostics, and predictive analytics.
3. Step-by-step troubleshooting methods for electrical faults.
4. Safety protocols during troubleshooting and repair work.
5. Final written test, post-test evaluation, and group discussion on key takeaways

Methodology:

- 50% lectures & concepts
- 10% Videos
- 10% Case studies
- 10% Exercises
- 10% Discussions
- 10% Software (if applicable or examples)

Course code: (TEEI019)